

## II. REMARKS

Applicant appreciates that the Examiner indicated that claims 17 and 21 have allowable subject matter (see p. 5, lines 12-14 of the Office Action, dated October 1, 2009).

By the present amendment, misnumbered second claim 34 have been amended, claims 17, 21 and 23-33 have been cancelled, and claims 36 and 37 have been newly added.

Specifically, the misnumbered second claim 34 has been amended to recite the correct number of the claim, i.e., “claim 35,” and to improve clarity. Claims 23-33 have been cancelled because they pertain to non-elected invention. Applicant respectfully requests that the Examiner withdraw the objection to the misnumbered second claim 34 in view of the above amendments.

New claim 36 incorporates subject matter from previous claims 14 and 17, and corresponds to previous claim 17 rewritten in independent form. Therefore, new claim 36 has the identical scope as previous claim 17. New claim 37 incorporates subject matter from claims 19 and 21, and corresponds to previous claim 21 rewritten in independent form. Therefore, new claim 37 has the identical scope as previous claim 21. New claims 36 and 37 are allowable for the reasons of record.

The present amendment adds no new matter to the above-captioned application.

### A. The Rejections

Claim 14, 18, 19 and 22 stand rejected under 35 U.S.C. § 102(b) as allegedly anticipated over JP 04-099837 (hereafter, “JP ‘837”).

Claims 34 and 35 stand rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over JP 56-090944 as applied to claims 14, 18, 19 and 22 above, and further in view of Acknowledged Prior Art Admission (hereafter “APAA”).

Applicant respectfully traverses the Examiner's rejections and requests reconsideration of the above-captioned application for the following reasons.

**B. Applicant's Arguments**

**i. The Section 102 Rejections**

Anticipation under 35 U.S.C. § 102 requires showing the presence in a single prior art reference disclosure of each and every element of the claimed invention, arranged as in the claim. Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick, 221 U.S.P.Q. 481, 485 (Fed. Cir. 1984).

In this case, the Examiner has failed to establish a prima facie case of anticipation against claims 14, 18, 19 and 22, because JP '837 does not teach, or suggest, each and every limitation recited by these claims.

**(a). JP '837**

JP '837 relates to a conductive material having high conductivity and excellent in migration resistance by specifying a composition constituted of Zr, Zn and Cu (JP '837, English language Abstract).

JP '837 does not teach, or suggest, (i) "a master alloy for casting a copper alloy, consisting of: (1) Cu: 40 to 80 wt.%; (2) Zr: 0.5 to 35 wt.%; (3) at least one element selected from the group consisting of Mg: 0.01 to 1 wt.%, Sn: 0.1 to 5 wt.%, B: 0.01 to 0.5 wt.%, Mn: 0.01 to 5 wt.% and Si: 0.01 to 1 wt.%; and (4) the balance of Zn," as recited in independent claim 14, and (ii) "a master alloy for casting a copper alloy, consisting of: (1) Cu: 40 to 80 wt.%; (2) Zr: 0.5 to 35 wt.%; (3) P: 0.01 to 3 wt.%; (4) at least one element selected from the group consisting of Mg: 0.01 to 1 wt.%, Sn: 0.1 to 5 wt.%, B: 0.01 to 0.5 wt.%, Mn: 0.01 to 5

wt.% and Si: 0.01 to 1 wt.%; and (5) the balance of Zn,” as recited in independent claim 19.

The Examiner contends that instant claim 14 is anticipated by samples 8 and 9 in Table 1 of JP ‘837, and claim 19 is anticipated by sample 6 in Table 1 of JP ‘837 (Office Action, dated October 1, 2009, at p. 2, line 18 to p. 3, line 1). However, samples 6, 8 and 9 of Table 1, reproduced below (except for other properties such as tensile strength and elongation), do not disclose the master alloy as claimed.

**Table 1**

		Chemical Composition (wt%)			
		Cu	Zr	Zn	Additional Element
Example	6	Balance	0.56	2.89	0.02P, 0.4Mn
	8	Balance	0.82	1.20	0.21Sn 0.56 Mg, 0.09Si
	9	Balance	0.95	2.49	0.41Si

Wt.% of the balance Cu in Table 1 above can be calculated by subtracting wt.% of other elements from 100 wt.%. Therefore, sample 6, 8 and 9 have the balance Cu of 96.13 wt.%, 97.12 wt.% and 96.15 wt.%, respectively. As described in Abstract of JP ‘837, the balance Cu contains inevitable impurities. It is well known to one having ordinary skill in the art that inevitable impurities in Cu are generally 0.1 wt.% or less. Considering the amount of impurities, samples 6, 8 and 9 thus contain the balance Cu of at least about 96 wt.%, about 97 wt.% and about 96 wt.%, respectively.

JP ‘837 shows another examples of conductive materials, for example, a first conductive material containing, by weight, 0.05 to 1.0 wt.% Zr, and 0.1 to 5.0 wt.% Zn, and the balance Cu with inevitable impurities, and a second conductive material containing, by weight, 0.05 to 1.0 wt.% Zr, 0.1 to 5.0 wt.% Zn, total 0.01 to 3.0 wt.% of one or two elements

selected from the group consisting of As, Al, Ag, P, Sn, Mg, Mn, Sb, Co, Pb, B, Si and Fe, and the balance Cu with inevitable impurities (JP '837, English language Abstract, and claims 1 and 2). By calculation, the content of Cu in the first conductive material is defined as 94 to 99.85 wt.%, and the content of Cu in the second conductive material is defined as 91 to 99.84 wt.%. Even if Cu alloys generally have inevitable impurities of 0.1 wt.% or less, the balance Cu of the first material would be at least about 94 wt. %, and the balance Cu of the second material would be about 91 wt.%.

By the above facts and discussion, it is clear that Cu content of the conductive materials in JP '837 must be at least about 91 wt.%.

In contrast, a master alloy, according to a preferred embodiment of the present invention, contains Cu of 40 to 80 wt.%, as claimed. In the master copper alloy of the present invention, Cu content is very important for the following reasons. If Cu occupies less than 40% or more than 80 wt.%, it takes a long time to melt the master alloy, the effective amount of Zr decreases and the formation of zirconium oxide is facilitated, thereby causing Zr to be totally ineffective. Therefore, Cu content of the master alloy of the present invention should be neither less than 40% nor more than 80 wt.% (Applicant's original disclosure, p. 10, line 8 to p. 11, line 18).

For all of the above reasons, JP '837 does not anticipate the subject matter of claims 14 and 19. Claims 18 and 22 are directly dependent from claims 14 and 19, respectively. Thus, JP '837 does not anticipate the subject matter of claims 18 and 22.

## **ii. The Section 103 Rejections**

A prima facie case of obviousness requires a showing that the scope and content of the prior art teaches each and every element of the claimed invention, and that the prior art provides some teaching, suggestion or motivation, or other legitimate reason, for combining

the references in the manner claimed. KSR International Co. v. Teleflex Inc., 127 S.Ct. 1727, 11739-41 (2007); In re Oetiker, 24 U.S. P.G.2d 1443 (Fed. Cir. 1992).

In this case, the Examiner has failed to establish a prima facie case of obviousness against claims 34 and 35, because the combination of JP '837 and APAA fails to teach all of the limitations of the claims.

For example, the combination of JP '837 and APAA does not show or suggest the limitation of “the master alloy has a grain size of 50µm or less, after casting” as recited in claims 34 and 35.

Furthermore, (1) the Examiner has failed to establish a legitimate reason to combine JP '837 and APAA to arrive Applicant's claimed invention and (2) the Examiner has failed to demonstrate that a person of ordinary skill in the art would have had a reasonable expectation of success of arriving at the claimed invention even if the modification was made. Thus, the rejections under §103 should be reconsidered and withdrawn.

**(a). JP '837**

JP '837 is discussed above.

As admitted by the Examiner (Office Action, dated October 1, 2009, at p. 4, lines 2-3), JP '837 not teach, or suggest, (i) “wherein the master alloy has a grain size of 50µm or less via grain refinement, after casting” as recited in claims 34 and 35.

**(b). APAA**

APAA relates to methods for refining grains of a copper alloy. According to APAA, grains of a copper alloy are refined during melt-solidification of the copper alloy, or by processing the copper alloy in heat (Applicant's original disclosure, p. 2, lines 1-9).

APAA does not teach, or suggest, (i) “wherein the master alloy has a grain size of 50 $\mu$ m or less via grain refinement, after casting” as recited in claims 34 and 35.

The Examiner contends that since the claimed alloys are formed by conventional casting method, the claimed grain size would have been inherently possessed by the material (of JP ‘837) and casting (Office Action, dated October 1, 2009, at p. 4, lines 6-7).

Applicant objects to the Examiner’s inherency argument. The Federal Circuit has held that a reference may inherently teach subject matter not explicitly disclosed by the reference when the disclosure is sufficient to show that the implicit subject matter is the natural result flowing from the explicitly disclosed subject matter. Continental Can Co. USA Inc. v. Monsanto Co., 20 U.S.P.Q.2d 1746, 1749 (Fed. Cir. 1991). However, inherency cannot be established by mere probabilities or possibilities, and the mere fact that a certain thing may result from a given set of circumstances is insufficient. Id. The Federal Circuit has ruled that inherency is a question of fact. In re Napier, 34 U.S.P.Q.2d 1782, 1784 (Fed. Cir. 1995). The Examiner’s naked speculation falls far short of establishing that the conductive material disclosed by JP ‘837 is inherently capable of producing refined grains having the claimed grain size, via a conventional casting method.

**(c). Summary of the Arguments**

**(1). There Is No Prima Facie Case**

The combination of JP ‘837 and APAA does not teach, or suggest, (i) “a master alloy for casting a copper alloy, consisting of: (1) Cu: 40 to 80 wt.%; (2) Zr: 0.5 to 35 wt.%; (3) at least one element selected from the group consisting of Mg: 0.01 to 1 wt.%, Sn: 0.1 to 5 wt.%, B: 0.01 to 0.5 wt.%, Mn: 0.01 to 5 wt.% and Si: 0.01 to 1 wt.%; and (4) the balance of Zn,” as recited in independent claim 14, (ii) “a master alloy for casting a copper alloy,

consisting of: (1) Cu: 40 to 80 wt.%; (2) Zr: 0.5 to 35 wt.%; (3) P: 0.01 to 3 wt.%; (4) at least one element selected from the group consisting of Mg: 0.01 to 1 wt.%, Sn: 0.1 to 5 wt.%, B: 0.01 to 0.5 wt.%, Mn: 0.01 to 5 wt.% and Si: 0.01 to 1 wt.%; and (5) the balance of Zn,” as recited in independent claim 19, and (iii) “wherein the master alloy has a grain size of 50 $\mu$ m or less via grain refinement, after casting” as recited in claims 34 and 35. For all of the above reasons, the Examiner has failed to establish a prima facie case of obviousness against claims 34 and 35 of the above-captioned application.

**(2). Unexpected Results Would Rebut Any Prima Facie Case, Even If Made**

Even assuming a prima facie showing of obviousness had been made, however, (which is not a valid assumption), the unexpected advantages of the claimed combination would be sufficient to rebut any such showing.

According to a preferred embodiment of the present invention, grain refinement in a copper alloy, e.g., making grains of a copper alloy having a size of 50 $\mu$ m or less as recited in claims 34 and 35, is strongly desirable because it is very effective in improving 0.2% proof strength (a strength when permanent distortion reaches 0.2%) of a master alloy (Applicant’s original disclosure, p. 1, lines 16-20, and p. 35, lines 14-25). For example, when modified copper alloys are cast under the identical condition, 0.2% proof strength of casting products of the modified copper alloy produced via grain refinement is improved by 10% or more (preferably 20% or more, more preferably 30% or more, and optically 40% or more), comparing to that of casting products of a modified copper alloy produced without grain refinement (Applicant’s original disclosure, p. 32, lines 18 to p. 33, line 1).

However, JP '837 and APAA, either solely or in combination, does not disclose the master alloy having the grain size of 50 $\mu$ m or less after casting and refining, as claimed, and 0.2% proof strength of the refined grains improved by 10% or more.

**(3). No Reasonable Expectation of Success of Achieving Applicant's Claimed Invention Even if the Combination of JP '837 and APAA Were Made**

A proper rejection under Section 103 requires showing (1) that a person of ordinary skill in the art would have had a legitimate reason to attempt to make the composition or device, or to carry out the claimed process, and (2) that the person of ordinary skill in the art would have had a reasonable expectation of success in doing so. PharmaStem Therapeutics, Inc. v. ViaCell, Inc., 491 F.3d 1342, 1360 (Fed. Cir. 2007). In this case, the Examiner has failed to demonstrate that a person of ordinary skill in the art would have had a legitimate reason to combine JP '837 and APAA, and a reasonable expectation of success of arriving at Applicant's claimed invention even if the modification was made.

While the problem to be solved of the present invention is refining grains of Cu alloy to improve 0.2% proof strength (Applicant's original disclosure, p. 1, lines 16-20), the aim of JP '837 is to provide an electro-conducting material suppressing a migration, which refers to, for example, movement of Cu ions from part having high electrical potential to part having low electrical potential in a circuit, wherein Cu ions are generated when water is present between various gaps of the circuit and, consequently, some portions of Cu alloy are dissolved in the water (JP '837, English Language Abstract, and col. 2, line 11 to col. 3, line 2). There is no similarity between the present invention and JP '837, in view of object of the invention.

Therefore, a person of ordinary skill in the art would have no reason to combine the references to arrive the Applicant's claimed invention. Even if the improper combination were made, a person of ordinary skill in the art would not have had a reasonable expectation of



success of arriving at the Applicant's claimed invention, because, for example, there is no teaching, suggestion or other reason cited by the Examiner for a master alloy having the grain size of 50 $\mu$ m or less after casting and refining, as recited in claims 34 and 35.

For all of the above reasons, the Examiner has failed to establish a prima facie case of obviousness against the Applicant's claimed invention. Also, the evidence of unexpected results demonstrates the non-obviousness of the claimed invention.

### **III. CONCLUSION**

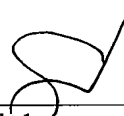
In view of the above amendments and arguments, Applicant respectfully asserts that the Examiner has failed to establish a prima facie case of anticipation and/or obviousness against Applicant's claimed invention.

For all of the above reasons, claims 14, 18, 19, 22 and 34-37 are in condition for allowance, and a prompt notice of allowance is earnestly solicited.

The below-signed attorney for Applicant welcomes any questions.

Respectfully submitted,

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